

Study on the Protection and Mechanism of Cervical Sympathetic Block (SB) on Combined Radiation and Burn Injury in Rats

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SB was used for the first time for emergency treatment of animals with RCI and showed significant benefit. The mechanism of SB treatment for rescue RCI was clarified

Severe injury



Systemic inflect



Tissue repair



**Stress dysfunction, SIRS,
shock, pyaemia, MODS, MOF**

Glucocorticoid

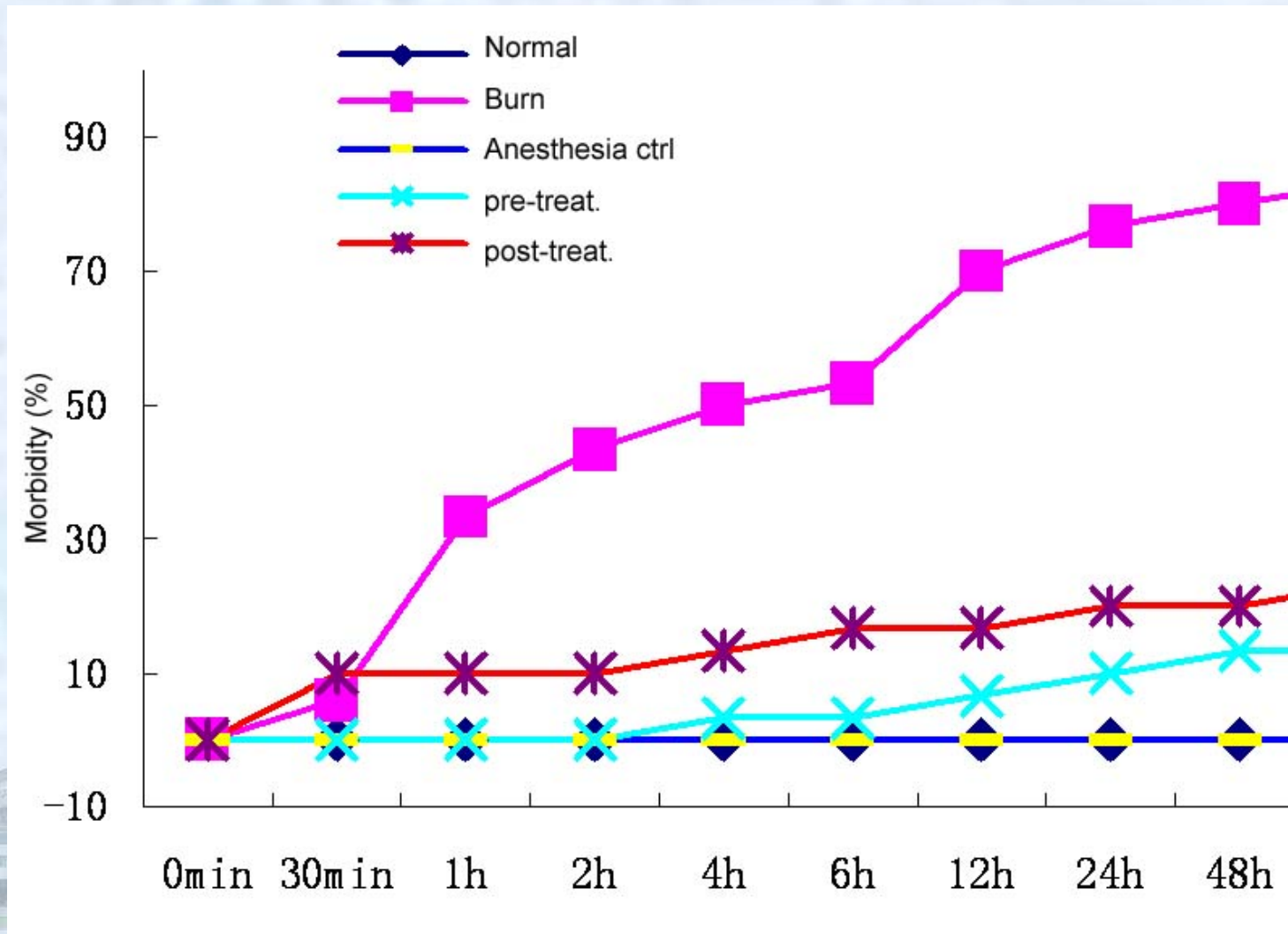
Antibodies

Serum filtration

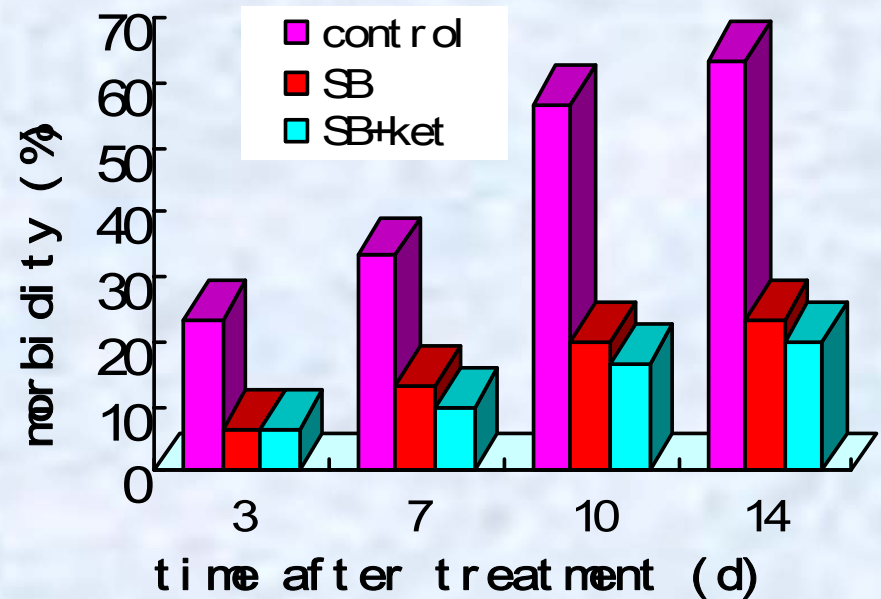
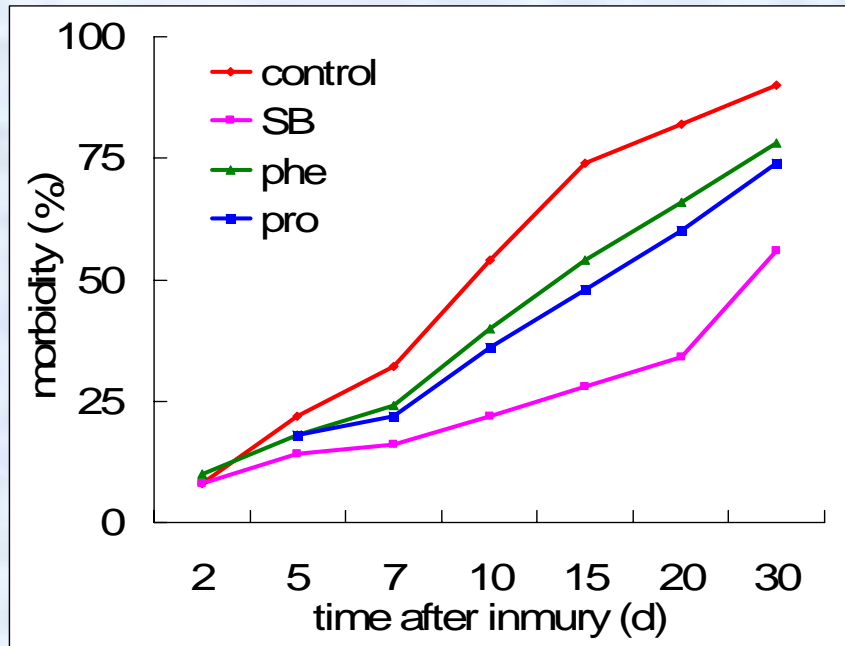


Death !!!

Ketamine reduced death rate of burned mice



SB rescued mice from RCI and morbidity decreased



SB-caused Horner's symptom

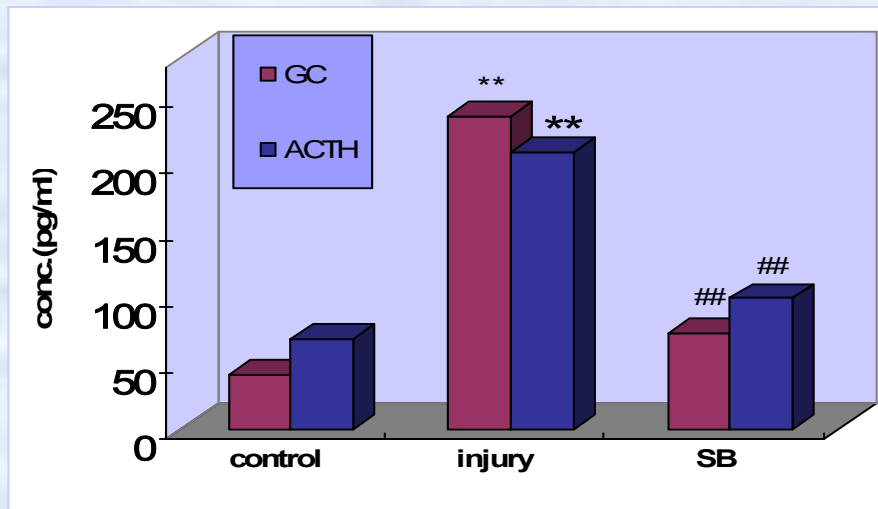
SB relieved hypothalamic-pituitary-adrenal axis overactivation in RCI mice (1)

SB inhibited overactivation of hippocampus NMDAR after RCI

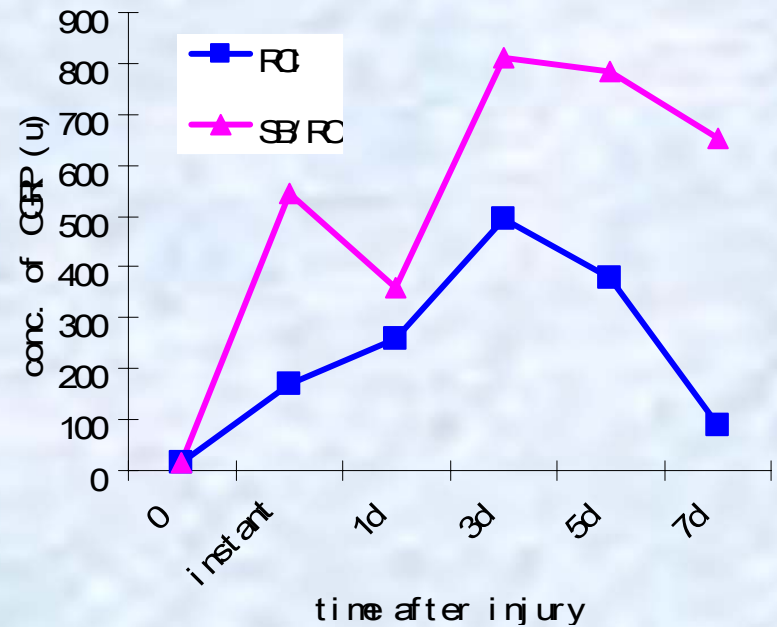
Group	Open time(ms)		Current amplitude(m s)	Open-state probability	Close time(ms)
	τ_1	τ_2			
Control	0.516±0.092	3.41±0.381	-2.81±0.19	0.086±0.006	99.5±35.8
injury	0.713±0.098*	5.01±0.731*	- 2.79±0.21	0.498±0.009**	93.1±42.1
SB	0.557±0.012#	3.81±0.479#	-2.84±0.13	0.225±0.007**##	95.1±28.7



SB relieved hypothalamic-pituitary-adrenal axis overactivation in RCI mice (2)

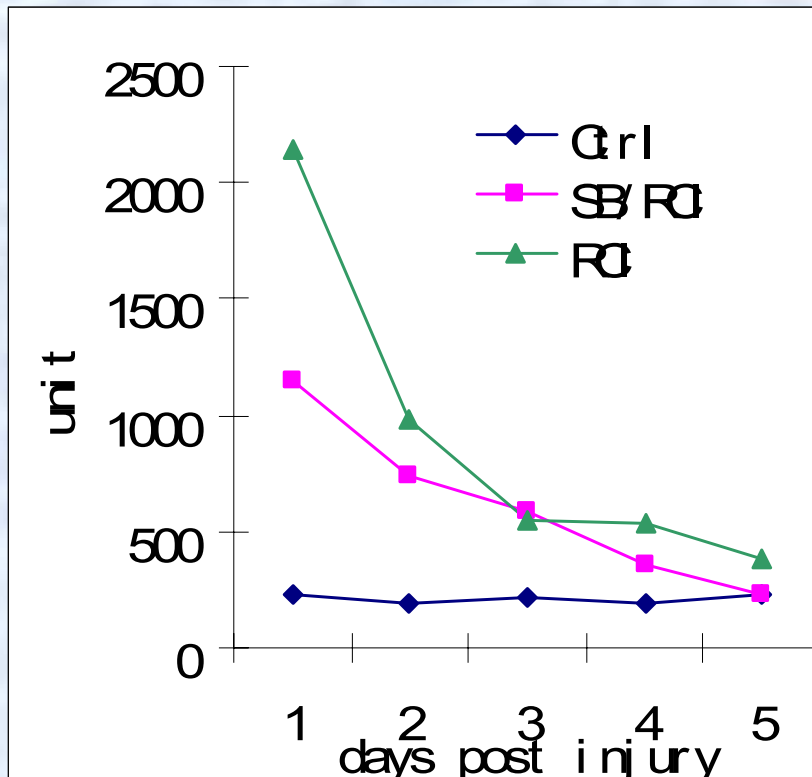


GC and ACTH concentration in RCI mice after SB treatment

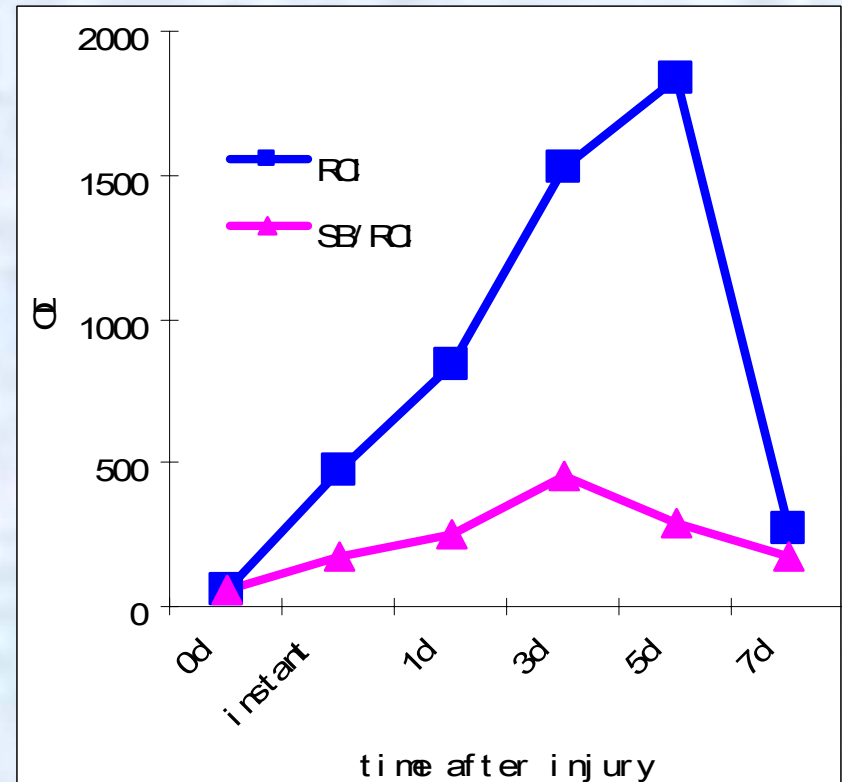


Serum conc. of CGRP in rat after SB treatment

SB relieved hypothalamic-pituitary-adrenal axis overactivation in RCI mice (3)

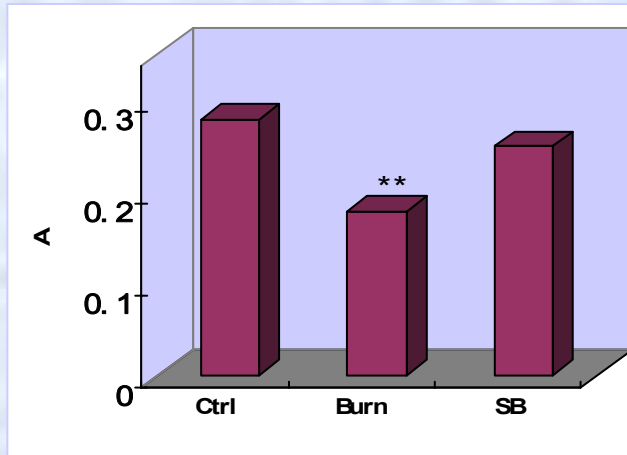


Serum concentration of epinephrine in rat after SB treatment

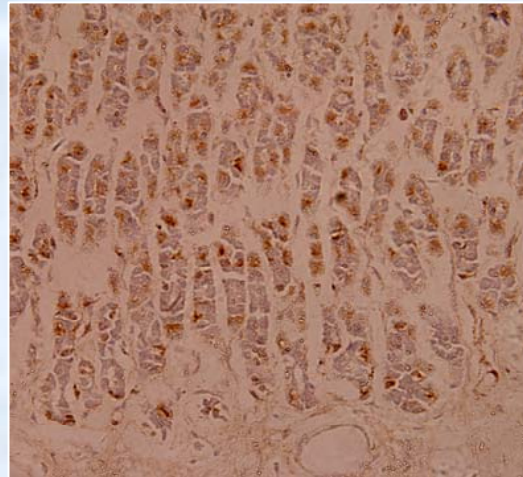


Serum conc. of P substance in rat after SB treatment

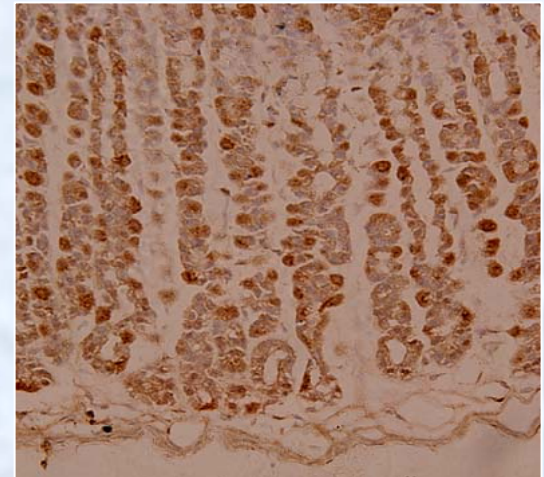
SB relieved hypothalamic-pituitary-adrenal axis overactivation in RCI mice (4)



SB regulated
GR expression



GR staining: Ctrl



SB treated

d3

RCI

SB/RCI



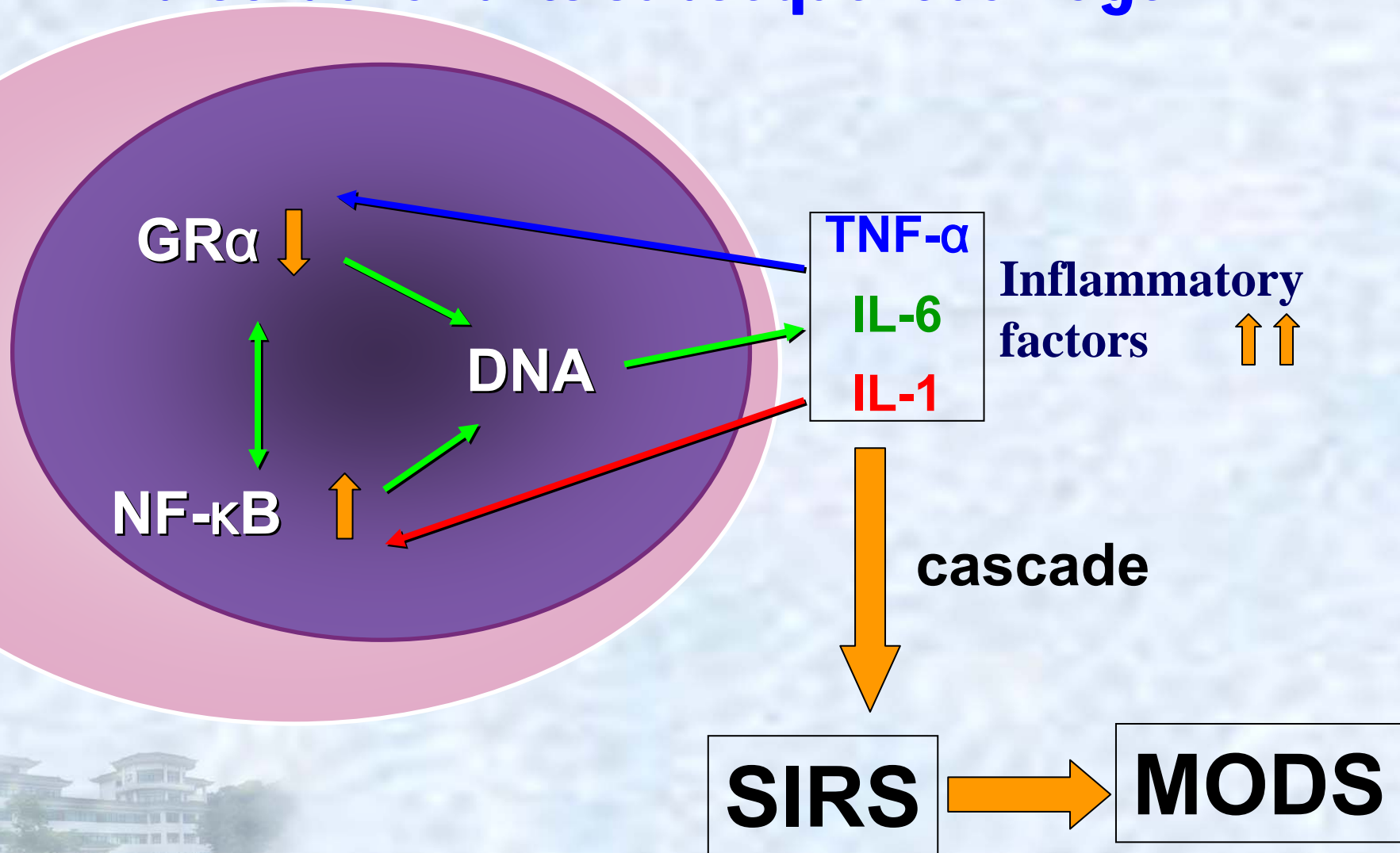
Liver GR

7d 3d 1d inst. ctrl inst. 1d 3d 7d

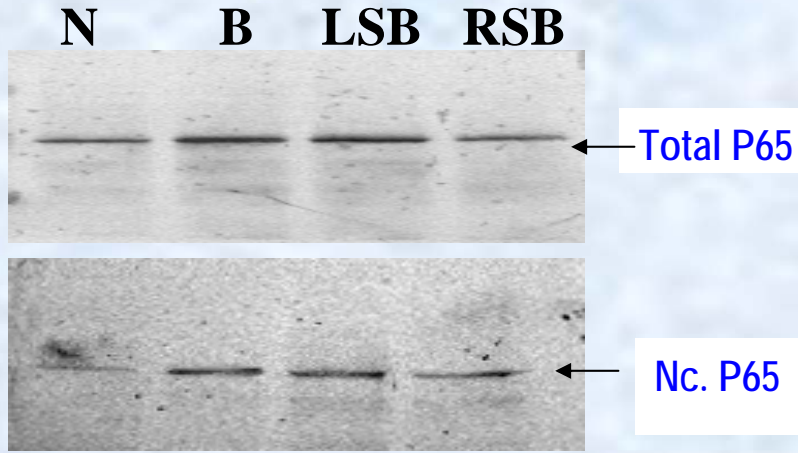
SB improved organ dysfunction from RCI

- The circulation condition of liver, kidney and hypothalamus improved
- The function of internal organs improved (↓ Cr, BUN; ↑ ALT, albumin)
- Immunological criteria (↑ CD3,4,8)
- Apoptosis related genes(↑ bcl-2, ↓ bax)

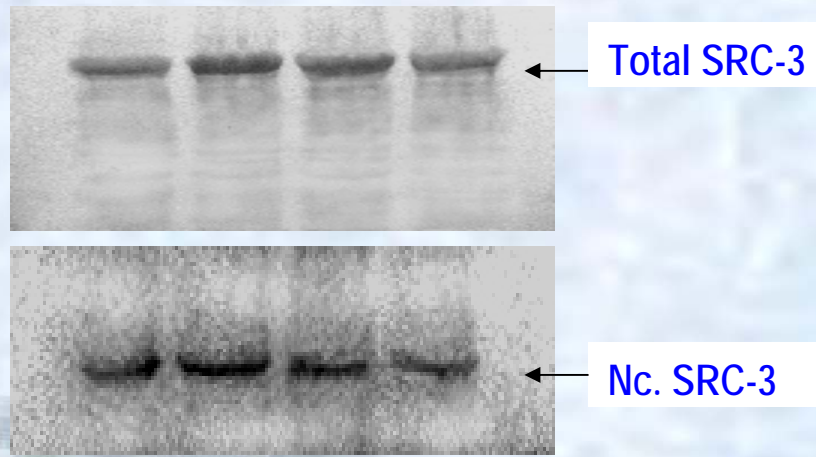
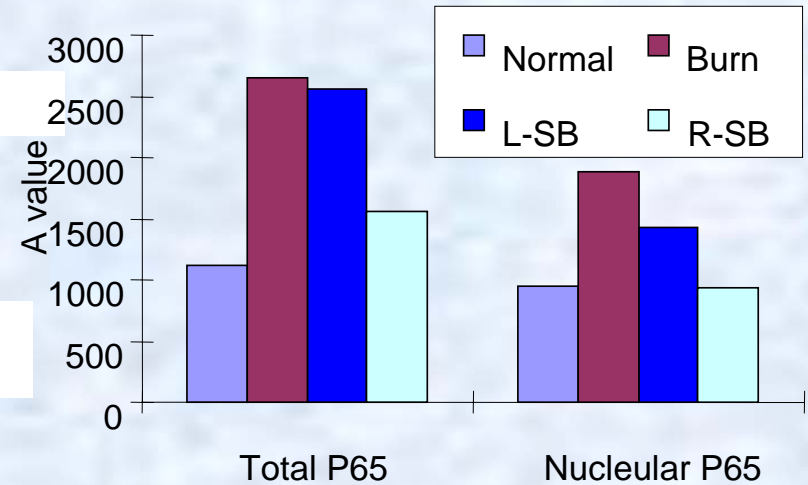
The mechanism of cascade effect of stress disorder and its subsequent damage



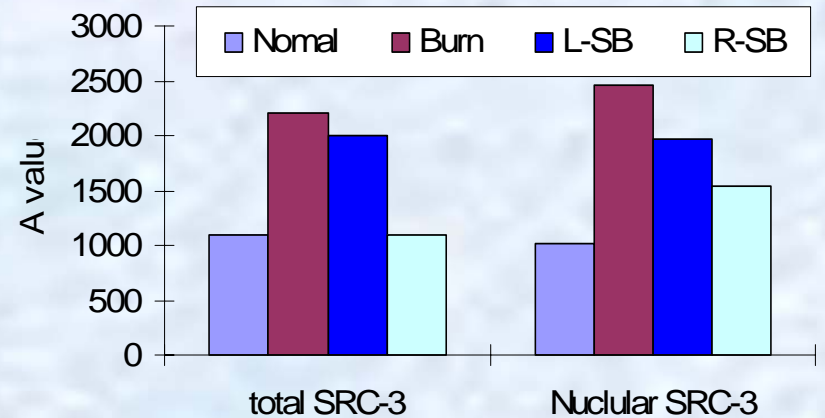
SB down-regulated NF- κ B and its coactivator SRC-3



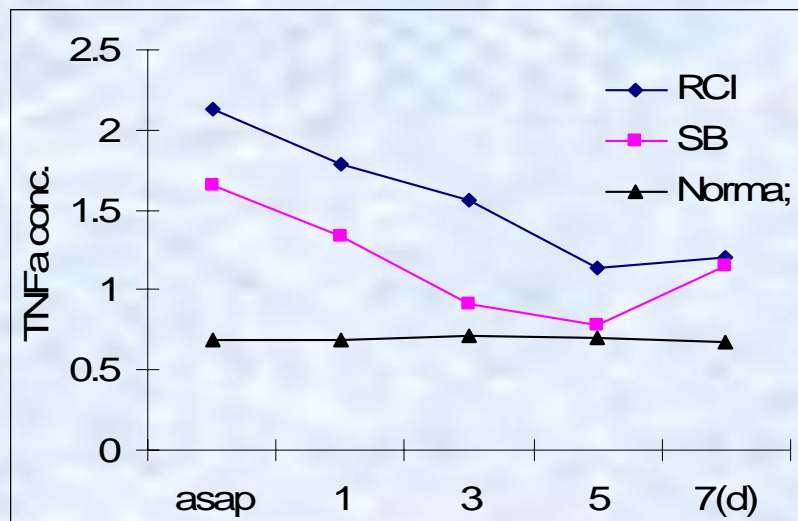
NF- κ B P65 Western blot



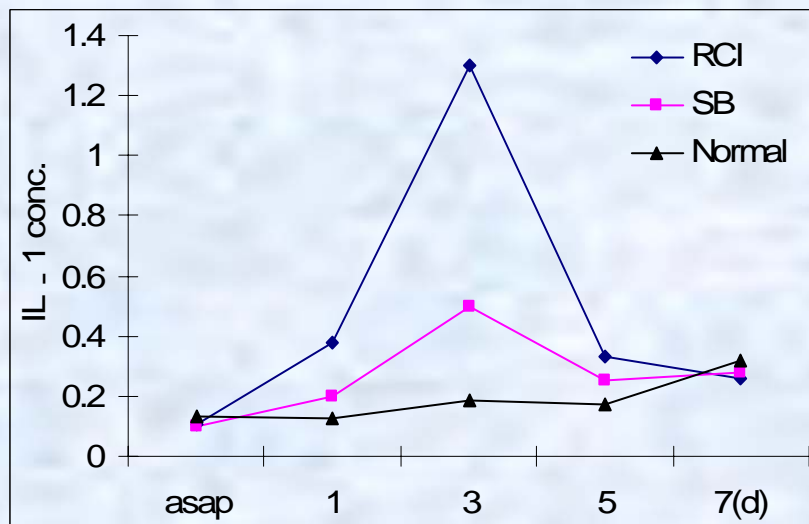
SRC-3 Western blot



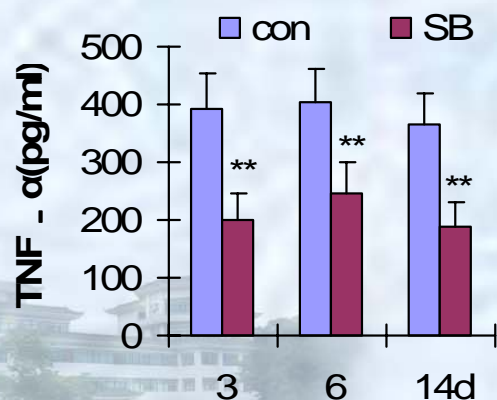
SB inhibited the production of inflammatory factors



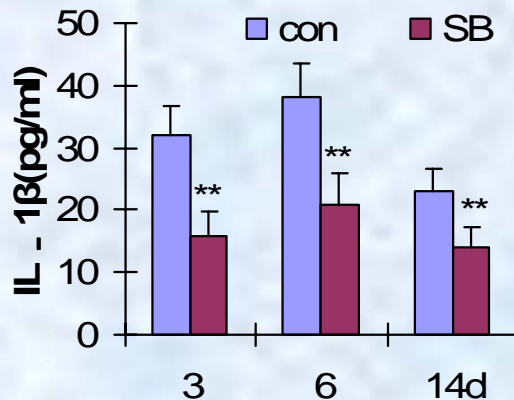
Intestinal mucosa: TNFα



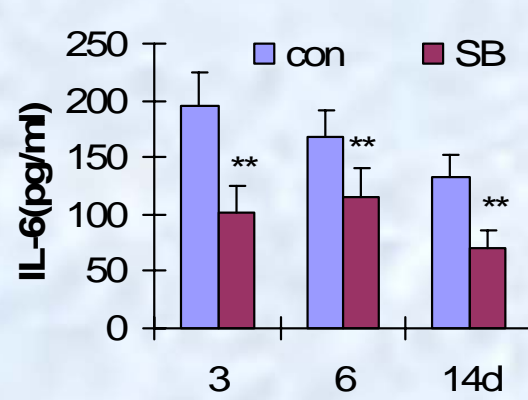
IL-1



Serum: TNF-α

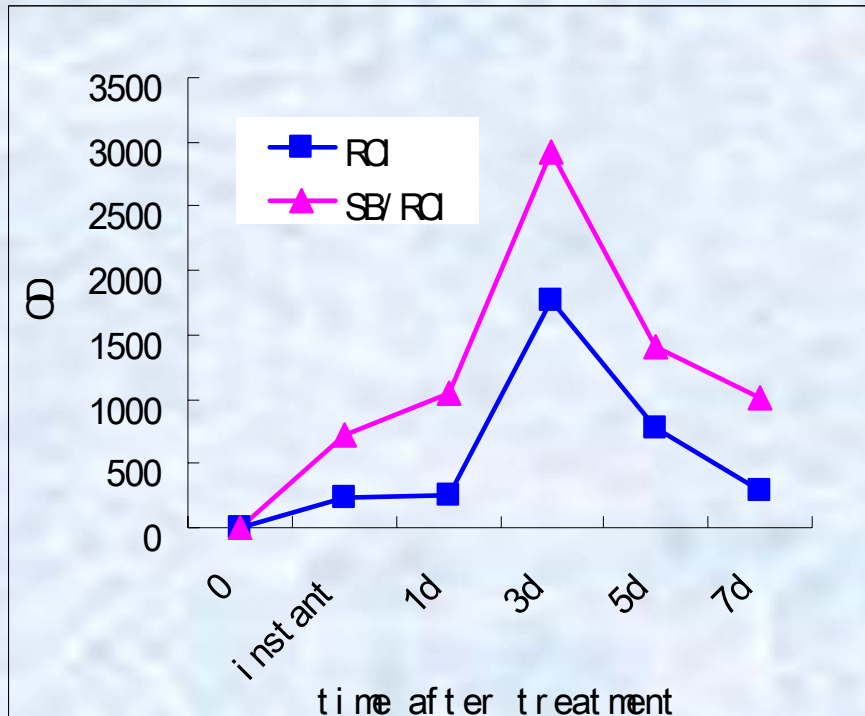


IL-1β

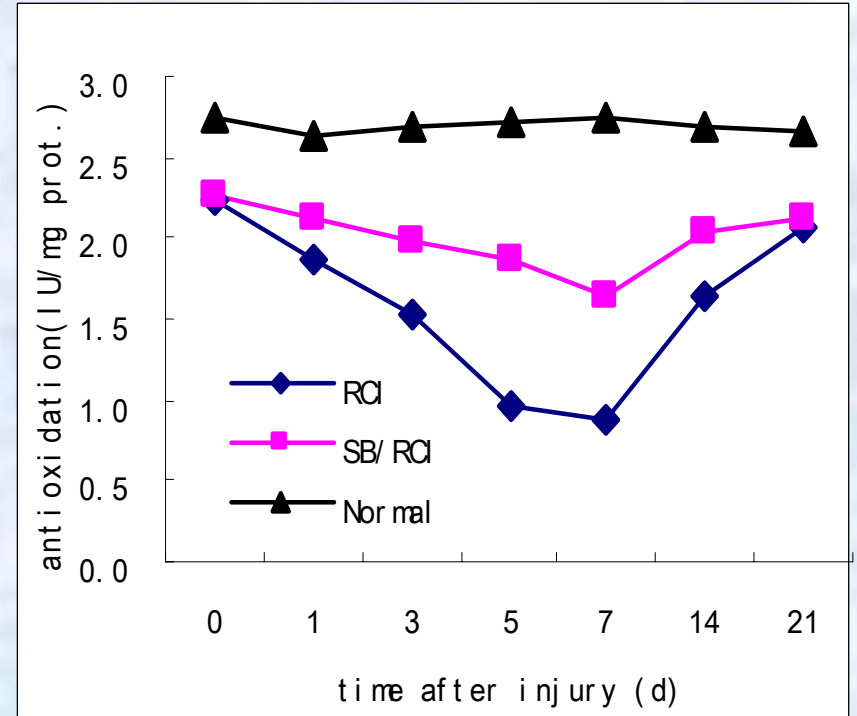


IL-6

Multi-function of SB



HSP70 expression



anti-oxidation inability

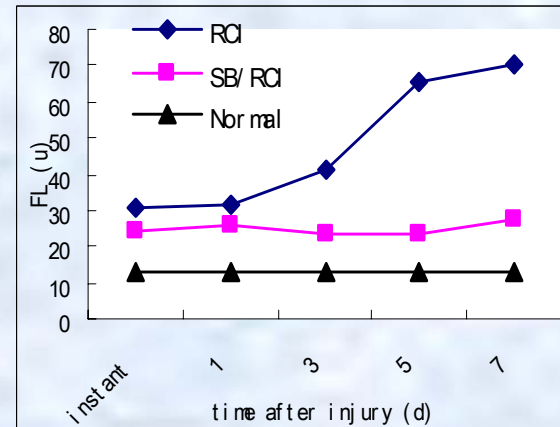
Multi-function of SB



GI ulcer: RCI



SB/RCI



permeability of IE

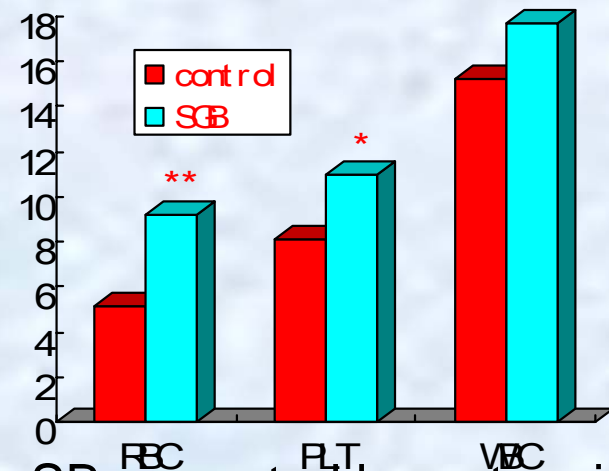


Control

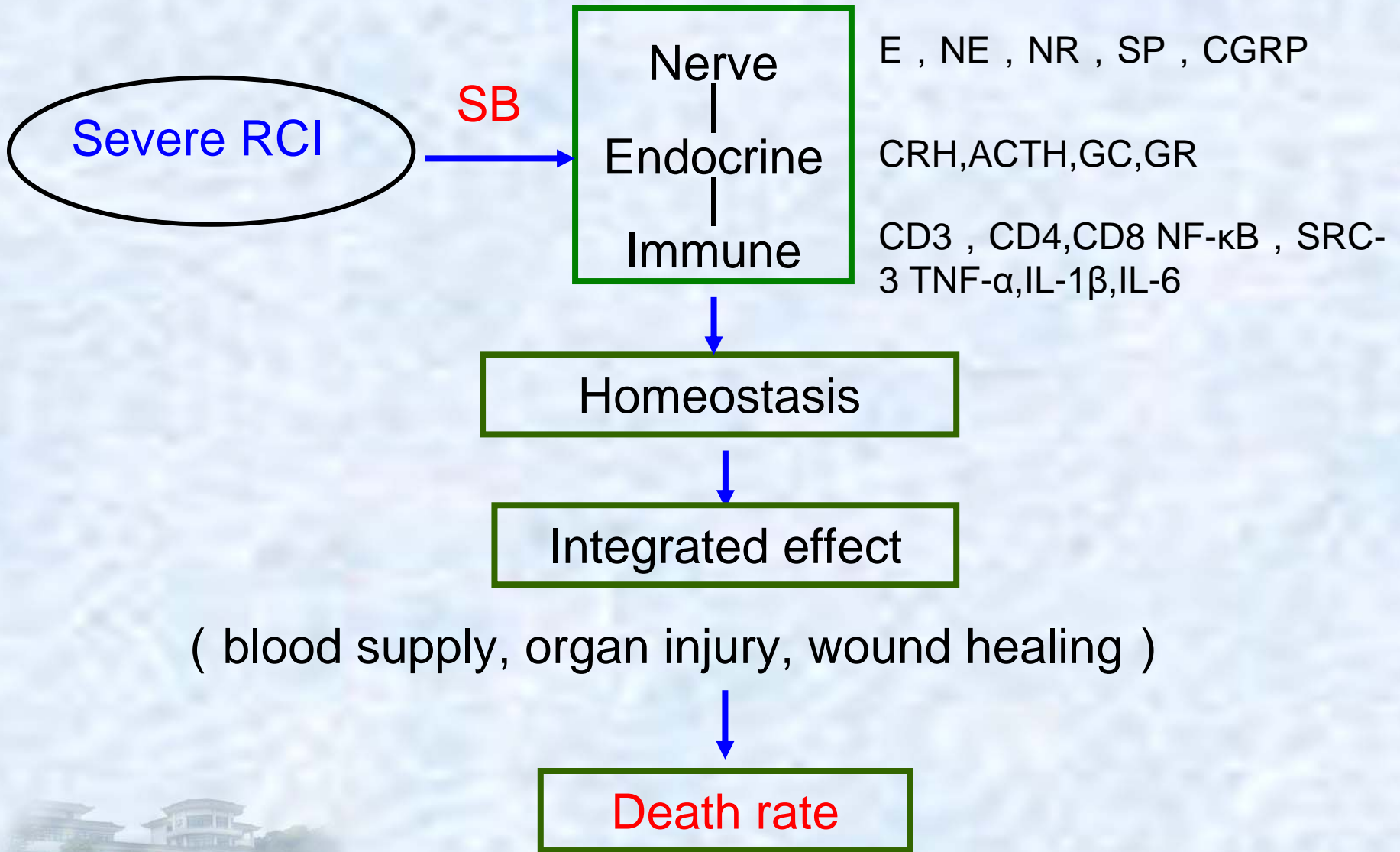


SB

SB promoted wound healing of RCI mice (32d)



SB promoted hematopoiesis recovery from RCI(21d)



Compared with other treatment, SB showed convincing efficacy, safety, low cost and easy manipulation, which made it possible to be applied in the rescue of severe trauma within the *golden window*, especially to early treatment if large population involved

Our research focused on the key problems in the development and regression of RCI, theoretically the mechanism of combined effect was clarified and practically some novel treatment were tested

**The above advancements of our
research are obviously meaningful for
on site emergency rescue and in
hospital treatment of RCI**



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